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# AGRICULTURAL NEWS LETTER

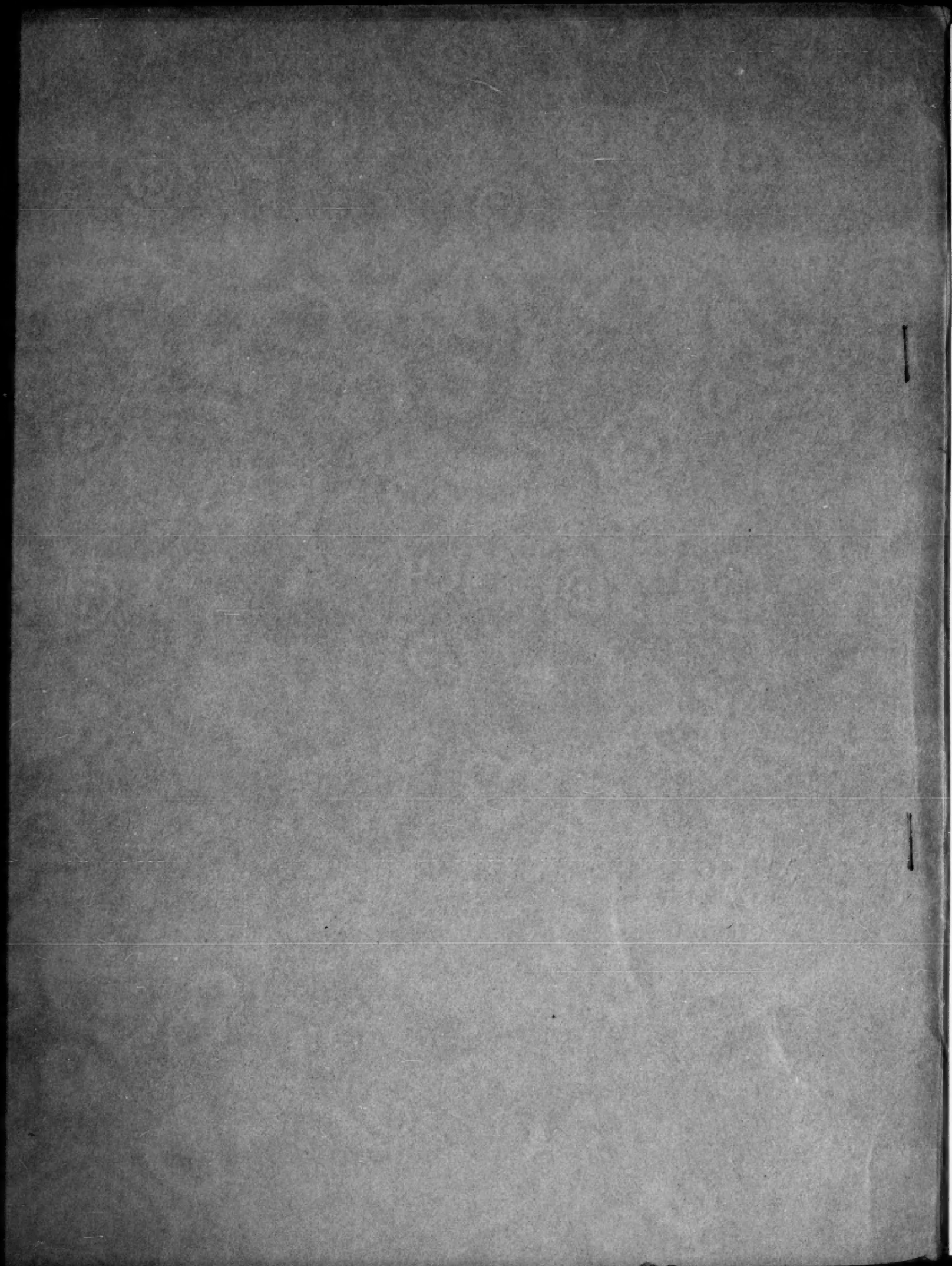
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This publication contains information regarding new developments of interest to agriculture based on laboratory and field investigations by the du Pont Company. It also contains published reports of investigators at agricultural experiment stations and other institutions as related to the Company's products and other subjects of agricultural interest.



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IMPORTANCE OF CLOSE COOPERATION OF GROWER WITH EXPERIMENT  
STATIONS AND TECHNICAL REPRESENTATIVES OF INDUSTRY STRESSED

Many factors affect the successful use of chemicals for insect or fungus disease control, Dr. W. H. Tisdale, manager, Du Pont Pest Control Research Section, recently told a group of Michigan horticulturists.

"For this reason each problem must be considered separately and a suitable product developed to meet the specific need," he said. "Even though a chemical may have a fairly wide range of applications, it is often necessary to formulate it differently for these different uses, or even different formulations for the same use may be required for different regional conditions.

"Due to the fact that more than one parasite often is involved, requiring a combination of products, spray and dust schedules may become complicated. A new material may not fit into such schedules without readjustment of the other formulations to make them compatible."

Dr. Tisdale emphasized that "the finishing touches on such jobs can be done most successfully by those who are thoroughly familiar with the details of the problems involved.

"It is for this reason that growers find it important to depend on their state experiment stations and technical representatives of industry who are familiar with local conditions, to assist them in solving their pest-control problems.

"There may be problems that are specific to small areas, or even to the individual farm. Many growers, and especially organized producers, find it profitable to develop research programs of their own to help solve some of their important problems, not only in pest control but along other important lines of crop improvement.

Suitable Insecticides, Fungicides, and Machines Must Be Available

Among other points stressed by Dr. Tisdale was the importance of proper application of materials used for control of insects and diseases. He said that when a spray or dust schedule is decided upon by the grower, he should be in position to know that the best possible insecticides and fungicides will be available at the right time to carry it out, and that suitable machines are available and in good repair for applying these products.

"The prescription is worthless unless the drugs are on hand to fill it at the proper time," he concluded.

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NEW PROCESS TO USE FARM BY-PRODUCTS, INCLUDING CORNCOBS,  
HULLS OF COTTONSEED, OATS, AND RICE, TO MAKE NYLON INTERMEDIATE

Development of a chemical process to use such agricultural by-products as corncobs, cottonseed hulls, and the hulls or bran of oats and rice in the making of nylon was disclosed March 27 by E. I. du Pont de Nemours & Company at the meeting of the National Farm Chemurgic Council in Oklahoma City.

Cellulose Materials Are Sources of Furfural

The cobs, hulls, and other cellulosic materials are the sources of a chemical known as furfural. The new process turns furfural into adiponitrile, a chemical important in making nylon. A new unit will be built at the Du Pont Electrochemicals Department's plant at Niagara Falls to produce the chemical.

Discussing the new process publicly for the first time, Dr. Oliver W. Cass, who headed a research team that worked on the project at the Niagara Falls laboratories, said the development, from the first small-scale laboratory experiments to the large semi-works units which can produce tons of adiponitrile from furfural, cost Du Pont about 12 years' time and approximately \$1,000,000.

200,000,000 Pounds of Cobs or Other By-Products May Be Used Annually

The Chemurgic Council was told that Du Pont had contracted with The Quaker Oats Company to begin supplying furfural as soon as the Niagara Falls unit begins operations. The Quaker Oats Company estimates it will require 200,000,000 pounds of corncobs, oat hulls, or similar agricultural by-products annually to make the maximum amount of furfural the Du Pont Company might need.

Nylon is now derived from the components of coal, air, and water. But, between the starting materials and the finished product, there are long, complicated, and expensive chemical and manufacturing processes. Du Pont research men have found that natural gas and petroleum also provide basic raw materials. The new process is a further step in diversification of sources of nylon ingredients.

Constant technical improvement of the present nylon processes has made it possible to reduce the price of nylon several times in the past seven years. One typical hosiery yarn, which was sold for \$4.27 a pound in January, 1940, is now priced at \$2.55.

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### New Process Makes Possible Use of Replaceable Source of Basic Chemical

However, it was emphasized that the use of agricultural by-products, as a starting material, would not necessarily bring a reduction of manufacturing costs in the near future. It was pointed out that this new process makes it possible to use a replaceable source for one of the basic chemicals needed for nylon. Coal and petroleum are irreplaceable resources.

Furfural has been used in chemical processes for 25 years, but it is little known to the layman. It is a tan-colored liquid with a faint bitter-almond odor. A rare chemical 30 years ago, it is now used in refining petroleum lubricants, butadiene for synthetic rubber, wood rosin, and vegetable oils.

### Furfural Made Largely From Corncobs Today

Furfural is manufactured largely from corncobs today. On thousands of farms, the cobs are mainly a nuisance after the shelled corn is shipped. They are a fire hazard in the barnyard and a detriment to the soil. While a few are used for fuel in farming communities, they burn very quickly and, compared to the total quantity of cobs produced annually, the amount used as fuel is infinitesimal.

### Furfural Also Made From Peanut Shells, Flax Shives, and Bagasse

Today many millions of pounds of furfural are required in industry and the price has dropped to below 10 cents per pound, compared to \$2.50 per pound when it was first marketed. But even the greatly increased production will take but a tiny fraction of the corncobs produced annually. Furfural is also made from the hulls of oats, rice, and cottonseed, peanut shells, flax shives, and bagasse, so that the raw materials for this important chemical are nation-wide.

In making furfural, the hulls or cobs are pressure-cooked with a weak acid. Then follows a complicated purification process. Next, there is a most exacting and complicated processing which includes reactions of furfural with steam, gases, and various other chemicals. The result is adiponitrile. This is further processed into hexamethylene diamine in another Du Pont plant at Belle, W. Va., and then reacted with adipic acid to produce nylon "salt," which looks much like table salt.

### Nylon Salt Dissolved In Water To Facilitate Handling and Shipping

To facilitate its handling, this "salt" -- chemists call it hexamethylene diammonium adipate -- is dissolved in water and transported by tank car to the nylon flake and yarn plants at Seaford, Del., and Martinsville, Va. There the "salt" is further processed and spun into yarn, and flake for molding and extrusion in the plastics industry.

Continued on next page

From 1923 to 1933, he was on the teaching staffs of Hamline, Oklahoma City University, and Minnesota. He has been with the Du Pont Company for 13 years.

To use corncobs as a basic raw material in nylon manufacture, there must be millions of dollars in plant investment, the technical knowledge and skill of hundreds of highly-trained research and development men, and the work of thousands of others in a great variety of jobs. Announcement of this new process came after 12 years of study and about \$1,000,000 spent on research, plans for the building of an extensive new plant, and the expansion of existing facilities.



DU PONT SALES PRICE INDEX REMAINS ALMOST UNCHANGED FOR  
SEVEN YEARS WHILE NATIONAL WHOLESALE INDEX INCREASES 57%

The Du Pont Company's Annual Report for 1946, published recently, reveals that since 1939, on the average, there has been almost no change in Du Pont sales prices, as measured by an index computed in accordance with commonly approved price-index technique. The U. S. Bureau of Labor Statistics index of all wholesale prices increased 57 per cent during the same period.

These and other facts are shown in a chart published in the report, copy of which will be sent upon request. The accompanying discussion points out that the index of Du Pont sales prices for 1946, as shown in the chart, does not fully reflect price increases on certain of the company's products which were made effective, for the most part, in December.

"These increases were made on certain products the selling prices of which had remained substantially unchanged during the period of price control and which no longer showed a satisfactory return, in view of the increased cost of manufacture," it explains. "The chart shows, for instance, that the costs of the principal raw materials purchased by the company advanced 64 per cent since 1939, and the average hourly compensation paid to Du Pont wage-roll employees increased 57 per cent."

While total operating taxes, per dollar of such income before taxes, dropped part way from the wartime levels, they were still 65 per cent higher than in 1939.

"The increases in the major elements in the cost of doing business, noted above, were partially offset during this period by economies resulting from an increasingly larger volume of production, progressive improvements in manufacturing processes and facilities, and other factors," the report adds.

#### DU PONT COMPANY PLANS TO MORE THAN DOUBLE RESEARCH FACILITIES

During the past year, the Du Pont Company's normal research activities, interrupted by the war, were resumed on a long-range, peacetime basis.

This fact is emphasized in the company's Annual Report for 1946, recently sent to more than 87,000 stockholders in booklet form. The report explains that a substantial number of research personnel completed their assignments at the ordnance plants the company operated for the government, or on other government projects, and returned to company service.

#### Construction Slowed by Materials Shortages and Other Factors

The projected postwar expansion of the company's research activities, which include additional studies dealing with insecticides, fungicides, weed killers and many other agricultural chemicals, was begun during 1946, although it was not possible to proceed with the construction of laboratory facilities to the extent originally contemplated because of materials shortages and other considerations, the report says.

#### Shortage of Trained Personnel Delays Desired Staff Increase

"Moreover, the supply of highly trained research personnel continues acutely short, and the company generally was not able to effect in 1946 the desired increase in its research staff," the report adds.

#### New Laboratories Or Additions to Be Provided at 15 Locations

"This construction program is planned to provide the company's research divisions with additional modern laboratory facilities to accommodate adequately the forecast increase in research personnel," it continues. "When completed, expanded facilities will be provided through new laboratories, or additions to existing laboratories, at fifteen locations. New construction, either authorized or projected, will more than double such facilities.

#### Organization of Company's Research Activities

"The company's research activities are organized under the same decentralized plan that guides its manufacturing operations and sales. Each of the ten industrial departments is responsible for the research necessary to support its present and future commercial interests -- accordingly, each such department maintains its own separate research division. In addition, the Central Chemical Department, the Engineering Department, and

Continued on next page





#### NYLON LEADERS GOOD FOR FISHING IN BOTH SALT AND FRESH WATERS

Nylon leaders are admirably suitable for every type of fishing in both salt and fresh water.

Fishing leaders used to be made by killing silkworms in vinegar, removing and stretching their silk sacs and drawing them through special sizing dies.

#### Low Visibility Among Several Features of Nylon Leaders

A statement by the Du Pont Plastics Department says that nylon leaders are perfectly round and exactly as thick in one place as they are in another. They are uniform in strength, eliminating the need to worry about weak spots due to flaws in the filament. It adds: "Since no soaking is required, no precious fishing time is wasted because the fisherman did not wet the leader pads the night before.

"Nylon leaders are harder to see because they have less sheen. Visibility is so low that fish are fooled into thinking the lure has no strings attached. This feature of camouflage is the leader's first function.

"Nylon is a solid monofilament that does not fray or split. It is not brittle. Thus icy water and freezing air do not harm nylon leaders. This is important on the opening days.

"Nylon does not rot. It lasts for years. And since sea water cannot harm it, nylon leaders can be used in any waters - fresh or salt."

#### Du Pont Supplies Nylon Monofilament to Tackle Manufacturers

The Du Pont Company makes nylon monofilament, but not finished leaders. Leading tackle manufacturers put it up and sell it in the following forms for every type of fishing: Tapered and level leaders, coils, (ten yards or more; 6 to 20 lb. test); tippets 20 inch lengths as fine as 0.005 inches); snelled hooks (for fresh and salt water fishing -- snells up to 50 pound test).

#### Booklet Tells How to Tie Knots

"Just remember to tie the knots right, pull them up slowly, and pull them up tight," says a booklet, "Knots and How to Tie Them with Du Pont Leader Material." This booklet, published by Du Pont to help fishermen get the fullest satisfaction from nylon leaders material, is available on request. Address E. I. du Pont de Nemours & Co., Plastics Department, Room 424, Arlington, N. J.

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TREATING WITH PHENYL MERCURY OLEATE PROTECTS CANVAS  
FUMIGATION TENTS AGAINST MILDEW FOR ABOUT THREE YEARS

Phenyl mercury oleate has been used with such success by numerous citrus growers of California in recent years that it is now established as the best chemical known for protecting canvas fumigation tents against mildew.

R. S. Woglum, entomologist of the California Fruit Growers Exchange, in his monthly bulletin to citrus growers, explains that canvas-tent deterioration from attacks by mildew fungi became so serious that the U. S. Department of Agriculture in 1941 experimented with several mildew-resistant treatments.

The results showed that an organic chemical known as phenyl mercury oleate was one of several promising materials, according to A. F. Swain and J. K. Primm, working for the Du Pont Company. They followed this work with extensive practical tests, and in 1942 recommended phenyl mercury oleate as an entirely satisfactory mildew-prevention treatment for fumigation tents.

"In the past five years many hundreds of tents have been treated with this material, and it is reported as the best treatment to date, giving protection against mildew for about three years," Mr. Woglum says.

Does Not Harm Fiber of Canvas

Mr. Woglums's statement points out that the chemical has no detrimental effect on the fiber of canvas, increases the weight of the material very little, and on fumigation tents does not react in any way with the hydrogen cyanide, used as a fumigant against red scale, to impair its efficiency, nor does it cause injury to trees being fumigated. He adds:

"The phenyl mercury oleate now used in mildew-proofing is produced by E. I. du Pont de Nemours & Co., and is designated as IN-5499," a 10 per cent phenyl mercury oleate product suitably compounded with other materials to permit field application after dilution with water.

The California entomologist says the usual method of applying is with a spray rig, using a fan-shaped spray from a conventional nozzle or gun. Although phenyl mercury oleate is not soluble in water, IN-5499 is readily dispersed in water to form an emulsion. For treating fumigation tents, an emulsion is made, by dispersing 2 pounds of IN-5499 in sufficient water to thoroughly wet 100 pounds of dry tent fabric.

Continued on next page

He cautions that the chemical appears to be very toxic to plant life, and that the material should be thoroughly washed from the spray tank, pump, hose, and nozzles after the tent treatment. He adds that if the spray rig is not properly washed out, "the first tank is likely to cause severe damage to trees, fruit, and leaves the next time the spray is used for insecticide work." He also asks operators applying the material to take precautions against breathing the vapor, and urges them to be careful in handling concentrated solutions.

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#### NYLON FUMIGATION TENT GIVES ENCOURAGING RESULTS IN EXPERIMENTS

Results of recent experimental work by University of California scientists indicate nylon is superior in many ways to fabrics generally used for tree-fumigation tents.

Among nylon's advantages are lighter weight; easier handling; resistance to mildew; and less water-holding capacity of the cloth. The resistance of the nylon fabric to tearing and snagging, its wearing ability and draping qualities, while requiring additional research, appear excellent -- often more satisfactory than in other materials used.

#### No Significant Difference In Kill of Red Scale

The kill of red scale on fumigated trees covered with nylon was 99.5 per cent, compared with 99.7 per cent on trees covered with 8-ounce canvas duck. This slight difference from identical treatment with Du Pont's "Hydrocy" hydrocyanic acid (HCN) gas fumigant is not considered significant.

#### Du Pont Supplies Experiment Station With Nylon Tent for Tests

For these tests, the Du Pont Company's Electrochemicals Department at El Monte, Calif., last fall turned over a 55-foot nylon tent to the Citrus Experiment Station at Riverside.

#### Research Workers Say Nylon Appears To Have Many Advantages

"It is too early to make any general statements regarding the use of nylon fabrics in fumigation tents but, from the experimental work already done, nylon appears to have many advantages over fabrics now used," according to D. L. Lindgren, P. D. Gearhart, and L. E. Vincent, members of the Division of Entomology, Citrus Experiment Station, University of California, who conducted the test at Riverside.

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### Use of Nylon Tents May Eliminate Need for Mechanical Puller

"The ease with which the 55-foot nylon tent is pulled from tree to tree in the field suggests the possibility of going back to hand pulling and eliminating the mechanical tent puller," they say. "The labor involved in rolling and moving the tents from grove to grove would be lessened with the lighter tent."

### One-Third As Heavy As Duck -- Half As Heavy As Drill

The nylon tent is only about one-third as heavy as one made from 8-ounce duck, and one-half as heavy as the 2.50 drill, the lightest tent material now in use.

### Slides Over Trees Easily -- Requires Less Pounds to Pull

"In measuring the pounds required to pull a 45-foot, 8-ounce Army duck over a tree in comparison with the 55-foot nylon tent, it was found the ratio was better than 3 to 1 in favor of the nylon," the California entomologists report. "In skinning the tent off the tree, it required 30 pounds pull for the nylon against 80 pounds for the canvas tent. The difference appears to be not entirely a matter of weight, since the nylon tent has a hard finish, and slides over the tree easily."

### Nylon Not Attacked by Mildew -- No Mildew-Proofing Needed

Duck and drill fabrics mildew when wet or damp and unless protected by chemical treatment will deteriorate rapidly, the California scientists say.

"New tents of these materials are mildew-proofed before being put out in strings, and the treatment has to be repeated every three years," they explain. "Tests indicate that nylon is not attacked by mildew, thereby eliminating the cost of mildew-proofing."

### Wet Nylon Tent Considerably Lighter Than Dry Canvas

They say the fabrics generally used for tents soak up considerable water, and fumigation has to be discontinued in many instances due to the increase in weight of the tent.

"While nylon cloth also becomes wet, its water-holding capacity appears to be much less than that of canvas or drill. In laboratory tests, canvas weighed dry and then weighed wet increased in weight by 120 per cent, while nylon increased less than 50 per cent."

### Nylon Hard to Tear -- Does Not Snag Readily -- Drapes Nicely

"It is too early to make any statements as to wearing or durability under conditions as they exist in the field," they caution. "Use of the

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tent under practical conditions will answer these points, but from general observation it appears that the wearing quality of nylon fabric is good, and it should last long under field conditions. Although 8-ounce canvas is almost three times as heavy as the nylon material under investigation, the nylon is more than twice as difficult to tear. The finish on the nylon is hard and smooth and, being light in weight, should not snag readily. The draping ability of the material appears to be satisfactory."

#### Porosity of Nylon Fabric Can Be Altered to Meet Requirements

Tests in the field using an 8-ounce duck tent and the nylon tent indicate the concentration of HCN drops slightly more rapidly under the nylon tent than under the canvas tent, but whether this difference will be significant will be determined in the field. The porosity of the nylon tent can be altered by changing the weave or by calendering or pressing the woven fabric, the California workers point out.

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#### ONE BUSHEL OF COTTONSEED WET DOWN WITH DDT SOLUTION SCATTERED OVER HEAVILY INFESTED ACRE KILLS 8,700 CRAWFISH IN MISSISSIPPI

DDT insecticide has been found to be effective against crawfish when applied on bait broadcast over the infested area, according to Dr. Clay Lyle, entomologist, Mississippi Agricultural Experiment Station.

A crawfish-eradication demonstration held by H. D. McMorrough, assistant county agent in Monroe County, Miss., resulted in the death of 8,700 crawfish on one acre at a cost of less than \$2.00 for insecticide and bait.

"On each acre of the infested cotton field being treated, Mr. McMorrough scattered one bushel of cottonseed wet down with a 2½ per cent water solution of DDT," Dr. Lyle reports. Ten quarts of the solution were sufficient to treat a bushel and a half of cottonseed.

"The next day he found dead crawfish all over the treated land, and no dead ones on the untreated area of the field."

Dr. Lyle points out that crawfish do a lot of damage on a considerable area in the Northeast Prairie section of Mississippi and on the same soil type of Alabama. While they cause no severe damage on good farm land in other parts of the country, Dr. Lyle says that "in poorly drained low spots they may cause trouble."

"During recent years we have been recommending treating burrows with a dilute creosote emulsion," he adds. "This was a practical treatment but required considerable labor."

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#### NEW PROCESS PACKS FROZEN FOODS IN CELLOPHANE, 40 BAGS A MINUTE

A new continuous process packages frozen foods in cellophane, producing in one minute 40 or more transparent bags sealed and ready to catch the eye of the shopper. It applies production-line methods to frozen-food packaging, enabling one operator to produce packages at this rate.

The advance was made possible by engineering research that adapted the standard automatic model "BB" "Transwrap" machine of Stokes and Smith Company, Philadelphia, to making packages for greater weight and bulk than bags for peanuts and candies, for which it was originally designed, and by development that provided cellophane to meet the specific needs of the new process.

#### Proper Type of Cellophane Provided by Du Pont

E. I. du Pont de Nemours and Company and Stokes and Smith cooperated in the development of the new machine. Du Pont research provided the proper type of cellophane which is essential to the successful operation of the process.

Visitors at the recent National Frozen Food Industry Exposition in San Francisco, were the first to see the new machine in operation. Du Pont also showed a movie of it in action.

#### Hands Do Not Touch Food

The development is regarded as a significant advance in the mechanization trends of the frozen-food industry. The machine automatically forms cellophane bags, fills the bags with frozen products, exhausts most of the air from them, and heat-seals the bags, all in one operation. One operator is needed to run it. Hands do not touch the food at any step.

Free-flowing vegetables such as lima beans, diced carrots, peas, combinations of carrots and peas, cut corn, succotash, and mixed products can be successfully packaged by the process. They may be frozen first and then packaged in the new machines, or wrapped fresh and then frozen within their cellophane bags.

#### Adaptable To Wide Variety of Package Types

An outstanding advantage of the new process is adaptability to a wide variety of package types. The basic unit usually is the single-wall, double-wall or laminated film bag. Double-wall or laminated bags are suitable for the retail trade as finished units without further wrapping. The single-wall bag may be used with such conventional containers as the window carton or tray, or blind carton, if desired.

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Retailing in the cellophane bag alone is practical, and this is the most economical unit to produce. It affords superior protection and visibility. Distribution tests have shown satisfactory performance of these automatically packaged units.

Use of the tray or window carton retains a substantial part of the visibility advantages, besides giving rigidity to the package. With trays or cartons, single-wall, instead of double-wall, bags may be used.

#### Embodies Most Modern Features of Mass-Production Methods

The new "Transwrap" embodies all the most modern features of mass-production methods. Vegetables are fed into the hopper at the top of the machine. Finished cellophane bags containing the right amount of product flow from the machine at rates as high as 40 or more per minute.

Each unit includes two fully automatic production lines, synchronized and turning out two finished bags at a time.

Cellophane is provided from standard rolls of stock size. An electric eye attachment permits the use of printed cellophane, or if plain film is used, brand labels may be affixed mechanically. The rolls are mounted on the machine, one on each side to feed each of the two packaging lines where a single-wall bag is used, or two on each side when a double-wall package is desired.

Each side of the machine is provided with its own set of adjustable measuring cups mounted in a rotating filler head. On each side, one cup at a time is passed over the tubes through which the product is discharged into the cellophane bags. As the draw-bar pulls down the cellophane tube, the meshed dies make a single seal, closing the top of one bag and the bottom of its follower.

Accurately measured portions of product, 12 ounces in the conventional package, pour into the bag as the bar progresses in its stroke to the bottom of its cycle. At the extreme lower limit of each stroke a final operation shears the transverse seal at its center, freeing the filled bag from the line. As the finished package drops from the delivery end of the line, the draw-bar travels upward again to repeat the cycle, and the package is ejected through a chute to a conveyor.

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MASH, MEDICATED WITH PHENOTHIAZINE, NICOTINE SULFATE, AND BENTONITE,  
CONTROLS BOTH CECAL WORMS AND ROUND WORMS IN POULTRY, SAYS U. S. D. A.

Phenothiazine, which when used alone gives excellent control of cecal worms in poultry, is even more effective when combined with nicotine sulfate and bentonite in ordinary mash, expelling not only the cecal worms but any round worms (ascarids) present in the intestinal tract, according to a statement recently released by the U. S. Bureau of Animal Industry.

The statement says that infestations of these worms have been checked and kept at a low level under farm conditions with this mixture, which was devised by the Bureau. It adds that in experiments, poultry fed the medicated mash on three consecutive days at intervals of three weeks expelled 99 per cent of the two kinds of worms.

The formula for the mixture is described in the statement issued by the Bureau, as follows: "Fifteen grams of 40 per cent nicotine sulfate (Black Leaf 40) solution, with 151 grams of phenothiazine, and 287 grams of bentonite (clay-like substance) in 44 pounds of ordinary chicken mash."

Round Worms Stunt Growth -- Cecal Worms Cause Inflammation

The Bureau statement points out that heavy infestation with round worms stunts the growth of young chicks so that they may finally die of malnutrition. When the cecal worm is present in the intestines of young birds, it may cause inflammation of the ceca; and with turkey poults, it is apt to transmit blackhead disease.

A recent Du Pont educational bulletin on "How to Control Worms in Livestock with Phenothiazine," which includes recommendations for administering phenothiazine to sheep, goats, hogs, cattle, horses, and mules, as well as to chickens and turkeys, says:

"Official figures show that poultrymen lose one out of every five birds from disease. Although internal parasites are not as noticeable as specific diseases, parasites do constitute a real menace to successful poultry raising, often being indirectly responsible for diseases.

"The cecal worm in chickens, scientists believe, is directly involved in the life cycle of the organism which causes the common turkey disease known as blackhead. Blackhead is ordinarily only mild in chickens, but they can be carriers of the organism and spread infestation to turkeys. Control of cecal worms in chickens is one measure of preventing infestation of turkeys. Phenothiazine is not a treatment for blackhead itself."

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#### NEW EGG STANDARDS CHART IN FOUR COLORS

A four-color chart illustrating the new standards of egg quality developed by the U. S. Department of Agriculture has been prepared by the Du Pont Company. The photographs are official U. S. D. A. pictures, showing the candled and broken-out appearance of these new egg grades.

The chart will be sent to anyone wishing a copy for reference or wanting additional copies for distribution to groups of interested poultrymen. Address the Editor, "Agricultural News Letter," Public Relations Department, Du Pont Company, Wilmington 98, Delaware.

#####

#### PRICE OF "DELSTEROL" REDUCED SEVENTH TIME IN SEVEN YEARS

For the seventh time in seven years the Du Pont Company has reduced the price of "Delsterol" "D"-activated animal sterol, in powder form. The new price is a cut of approximately 13 per cent.

"Delsterol" is widely used by manufacturers of poultry feed as a source of vitamin D<sub>3</sub>. This so-called "sunshine vitamin" prevents rickets in chicks and insures satisfactory egg yields and desirable hatching qualities in the eggs.

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#### MARE MAKES "UNEVENTFUL RECOVERY" FROM NECK OPERATION

A practicing veterinarian in Oklahoma removed a piece of bailing wire from the neck of a 23-year-old mare, and then packed the wound with gauze soaked in a sulfanilamide-sulfathiazole-urea mixture. The animal soon recovered.

Dr. Manfred Parker of Kingfisher, Oklahoma, telling the story in the January "Veterinary Medicine," says he diagnosed the case as choke. Following unsuccessful attempts to relieve the animal by external manipulation of the swelling and other usual methods, Dr. Parker anesthetized her. Further attempts at manual removal of the obstruction were unsuccessful.

"After preparation of the operative area, a four-inch skin incision was made over the swelling," Dr. Parker reports.

A two-inch piece of bailing wire, of which  $\frac{1}{4}$  inch had passed through the wall of the esophagus, was removed with pliers, "thereby making esophagotomy unnecessary."

Dr. Parker then applied the urea-sulfa mixture to the neck wound and, as he puts it, "the mare made an uneventful recovery."

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NEW "PEST CONTROL GUIDE" IN BOOKLET FORM

A new, illustrated "Pest Control Guide," said to be "as complete as contemporary knowledge and experience can make it," has been prepared by the Grasselli Chemicals Department of the Du Pont Company.

The guide is offered "as an aid to farmers, commercial growers, orchardists, nurserymen, agricultural agents, educators, and others interested in having a ready reference to the control of pests on the farm."

Lists Important Insects, Plant Diseases, and Weeds

The booklet points out that, although it is not possible to include all of the pests that plague the farmer, every attempt has been made to make it as complete and accurate as possible. It adds that "in the fluid world of agricultural chemicals, continued progress and development may affect the listing," and that, as additional information becomes available, it will be incorporated in future editions.

The booklet has an "Index of Pests", listing alphabetically many of the important insects, plant diseases, or weeds affecting farm crops, orchards, vegetables, gardens, vineyards, home grounds, farm animals, and buildings, with a reference to the product used in the control of that specific pest.

Another section describes briefly each Du Pont product for farm pest control, classified as insecticides, fungicides, weed killers, and other products. The pests controlled by these products and the type of crop or animal which they affect are listed for convenient reference.

Contains Compatibility Chart

As a center spread, the booklet carries a diagram showing the degree of compatibility of Du Pont spray and dust materials. This chart should be useful to large-scale users and formulators desiring to make their own combinations of materials for pest control. (This chart is discussed in detail on page 59.)

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NOTE: Copy of the new "Du Pont Pest Control Guide," mentioned above, will be sent upon request. Address Agricultural Division, Grasselli Chemicals Department, Du Pont Company, Wilmington 98, Delaware.

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SPRAYING AND DUSTING MATERIALS TO BE COMBINED FOR APPLICATION TO  
PLANTS MUST BE CHEMICALLY, PHYSICALLY, AND BIOLOGICALLY COMPATIBLE

When combined, one insecticide or fungicide must generally be compatible with another to work successfully for the purposes intended, without injury to the plants on which they are applied. Spraying and dusting chemicals, to be compatible, must be chemically, physically, and biologically satisfactory to use with each other.

To help those who mix materials avoid costly errors, the Du Pont Company has prepared a chart listing its products that are compatible, those that are compatible but not recommended for mixing, those that are not compatible, and those whose compatibility is questionable or not known.

Purpose of Combining Two or More Materials

The chart explains that it is frequently desirable from the standpoint of disease and insect control and the efficient use of labor and equipment to combine two or more materials for application to plants. It continues:

"The products available for this purpose have usually proved satisfactory under certain conditions to control a specific disease or insect. However, it is not always possible to combine two or more of these insecticides or fungicides and obtain results as satisfactory as when they are used separately. Therefore, consideration must be given to spraying and dusting chemicals as being compatible or incompatible with certain other chemicals of similar usefulness."

Any One of Three Types May Affect Efficiency of Materials

The discussion points out that any one of the three types of compatibility may affect the efficiency of the mixture of materials.

Chemical Compatibility -- This refers to the chemical reaction that may take place when two materials are combined. If there is no reaction, there is reason to believe the effectiveness of the individual materials is not altered.

"It is possible for chemically incompatible materials to be either useful or harmful in a mixture when applied to plants as an insecticide or fungicide," the chart says. For example, nicotine sulfate and lime when used with soap in a spray react chemically, but favorably. The lime and soap in this mixture release some of the nicotine, making it more effective against aphids and sucking insects than when the nicotine is used alone. In this case, chemical incompatibility is an advantage. On the

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other hand, when a fixed nicotine, nicotine oil, or nicotine bentonite used for codling-moth control is combined with an alkaline material, the effective period of a week to 10 days of such fixed nicotine is definitely reduced -- an example of chemical incompatibility that is undesirable.

Physical Compatibility -- In this case, the compatibility of the materials can be determined generally on sight. When materials are physically incompatible they combine to form a mixture that can not be used in applicators or applied to plants. Their combination may result in the formation of a buttery mass or a heavy precipitate that will clog screens in the equipment or not spread evenly on plants for effective results. When lead arsenate is used in combination with certain oil sprays, the buttery mass that results is an excellent example of physical incompatibility.

"The combination of certain spreading and wetting agents in the same mixture or in mixtures with insecticides or fungicides may produce a condition that could also be listed as physical incompatibility, despite the fact that no precipitate or similar reaction is created," it continues. "In such a case, rapid 'run-off' of material from the plant foliage would result."

Biological Compatibility -- This is the ability of one material to mix with another without reducing its effectiveness against insects or diseases, and without injury to the plant on which the mixture may be applied.

"Often materials are perfectly safe when used alone on plants, but when combined with another material cause serious plant injury," the chart warns. One of the outstanding examples of this situation is the foliage burning that results from the combination of "Krenite" dinitro spray with oil sprays; or the combination of cryolite and lime. Another phase of this same situation is the reduced effectiveness of the nicotine (Black Leaf 155) and lime.

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NOTE: For copy of chart, "Compatibility of Du Pont Spraying and Dusting Materials," write the Agricultural Chemicals Division, Grasselli Chemicals Department, Du Pont Company, Wilmington 98, Delaware.

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